

**ABSTRACT**

A multi-channel bio-separation detection method and apparatus in which a single  
5 detector is coupled to a plurality of radiation sources, in a one detector/many radiation  
sources configuration. Each radiation source directs radiation at one detection zone of a  
single separation channel, and a single detector is applied to detect light emissions from  
the detection zones of several separation channels. The light sources direct radiation at  
the detection zones in a predetermined sequence and further in a cyclic manner, with the  
10 detector output synchronized to the light sources by a controller. Bio-separation may be  
conducted simultaneously in all the channels in parallel, with detection time-staggered  
and/or time multiplexed with respect to the light sources. In one embodiment, low cost  
light emitting diodes may be used as light sources. In another aspect, the detection  
scheme is configured for radiation induced fluorescence detection in a multi-channel  
15 capillary electrophoresis instrument.